

What we claim is:

1. A method for fining a metal surface, comprising a process for forming crystal grains having sizes less than $1\text{ }\mu\text{ m}$ at the surface of a metal product by means of projecting or peening shots or projectiles to the surface while a power per unit of area of the surface is controlled at a predetermined value.
2. A method for fining a metal surface according to claim 1, wherein the shots or projectiles are made from high-carbon steel, ferrous metallic glass, or stainless steel, and the diameters of the shots or projectiles are $30\text{ }\mu\text{ m}$ to $2000\text{ }\mu\text{ m}$.
3. A method for fining a metal surface according to either of claims 1 and 2, wherein the power per unit of area is greater than $11\text{ KJ/sec} * \text{mm}^2$.
4. A method for fining a metal surface according to any of claims 1, 2, and 3, wherein the process for projecting or peening shots or projectiles to the surface is carried out while the temperature of the metal surface is controlled to be between room temperature and $-150\text{ }^{\circ}\text{C}$.
5. A method for fining a metal surface according to any of claims 1–4, wherein the unit area is calculated by multiplying a contact surface of a projectile or a shot by a number of the shots or projectiles.
6. A method for fining a metal surface according to claim 5, wherein the unit area is calculated by subtracting the overlapped areas that is calculated based on the number of shots or projectiles that have their contact surfaces overlap from the sum of the contact surfaces.
7. A metal product having surfaces hardened by the method for fining a metal surface according to any of claims 1–6.